Introduction

Key to the evaluation of the route concepts is the development of objective performance measures. These performance measures serve as "yardsticks" for assessing the degree to which an alternative achieves an intended goal. They also permit an objective method for comparing the relative performance of the alternatives.

The performance measures for this project were first documented in the Purpose and Need Statement. Each performance measure relates to a specific need and associated goal.

Each performance measure is grouped into one of ten "families" of similar factors and each family relates to a specific need and goal/policy for I-69. This Appendix, Appendix B, gives detailed information about the four families of Economic Development Performance Measures.

Since most of the factors measure different transportation or economic variables, they are often quantified in different units of measurement. For example, proximity measures are tabulations of the population within a specified number of minutes from a city or some other important destination(s). In this case, the unit of measurement is people. On the other hand, safety data are measured by the number of vehicular crashes and business cost savings is measured in dollars. In some cases more is better; in some cases, less is better. For example, a route concept that provides a shorter travel time between Evansville and Indianapolis is better (at least on that performance measure) than one with a longer travel time. By contrast, a route concept that can be expected to stimulate more jobs is better than one that would stimulate fewer.

In order to simplify the analysis and reduce potential sources of confusion, all performance measures have been converted from their original unit of measure to a value that has been scaled between 0 and 100. Moreover, all performance measures in which less is better have been inverted and scaled on the same 0 – 100 yardstick. In other words, the alternative with the poorest score is always indexed to 0 and the alternative with the best score is always indexed to 100. The adoption of this scoring practice allows for simple comparisons between totally different types of measures. It also provides more information than simply ranking the alternatives.

Another analytical practice has been to compute an *average composite score* for each *family* of performance measures. This practice has simplified the analytical process; now, we only have to look at 10 sets of scores rather than 40. Moreover, this practice has reduced the possibility that performance measures that tend to measure the same thing are double-counted.

The main text of the Environmental Impact Statement contains the average composite scores for each family. Appendices A - C give the raw values of the individual performance measures, along with their respective scaled scores.

Economic Development Performance Measures

1. Monetary Cost Reductions

One of the findings of the Purpose and Need Statement is that Southern Indiana businesses are at a competitive disadvantage due to relatively higher costs associated with the remoteness of the region. Accordingly, a goal of I-69 is to assist businesses and households by reducing their transportation-related costs.

Most major surface transportation projects have a direct effect on the economy that goes beyond the costs of construction and maintenance. This economic impact is the result of (1) time saved, (2) changes in vehicle operating costs, and (3) reductions in traffic accidents. However, not all of the value of these "user benefits" translates into a direct economic impact. For example, while time saved for a recreation trip has real value, it is not the same as time saved for work-related traffic that is "on-the clock," and costs businesses actual cash. Similarly, the value of "pain and suffering" resulting from a traffic accident (as real as it is to the people involved) may not translate into value that finds its way into the economy.

Monetary cost reductions are that subset of highway user benefits that reduce actual costs or increase savings. These have "real money value" which is fed directly into the economy. Note that these dollars are distinct from indirect or induced economic impacts.

Tables and Figures B1 through B3 show the cost reductions from the three categories of monetary cost savings. Table and Figure B4 show the cost reductions from the total of the three categories. Note that Table B2 shows negative Vehicle Operating benefit for all alternatives. Transportation improvements cause increases in average vehicle speed, which tends to increase per-mile consumption rates for fuel, tires, and motor oil. In addition, vehicle maintenance and depreciation increase as well.

Table B1 - Year 2025 Truck and On-The Clock Auto Travel Time (Mobility) Benefits

Alternative	Truck & On-the-Clock Auto Trips Travel Time Mobility Benefits	Scaled Monetary Mobility Benefit Scores	Rank
NB	$0	0.00	20
A	$8,897,377	35.05	19
B1	$20,264,556	79.83	9
B2	$22,815,301	89.88	4
C1	$14,740,360	58.07	16
C2	$20,355,195	80.19	8
D	$18,492,620	72.85	12
E	$10,555,216	41.58	18
F1	$20,162,389	79.43	10
F2	$25,385,140	100.00	1
G	$15,960,753	62.87	14
H1	$22,209,504	87.49	5
H2	$24,880,117	98.01	2
I	$13,624,508	53.67	17
J	$14,945,104	58.87	15
K	$17,067,906	67.24	13
L1	$20,408,850	80.40	7
L2	$22,883,818	90.15	3
M	$19,586,141	77.16	11
N	$21,417,600	84.37	6

Figure B1 - Scaled Year 2025 Truck and On-The Clock Auto Travel Time (Mobility) Benefits

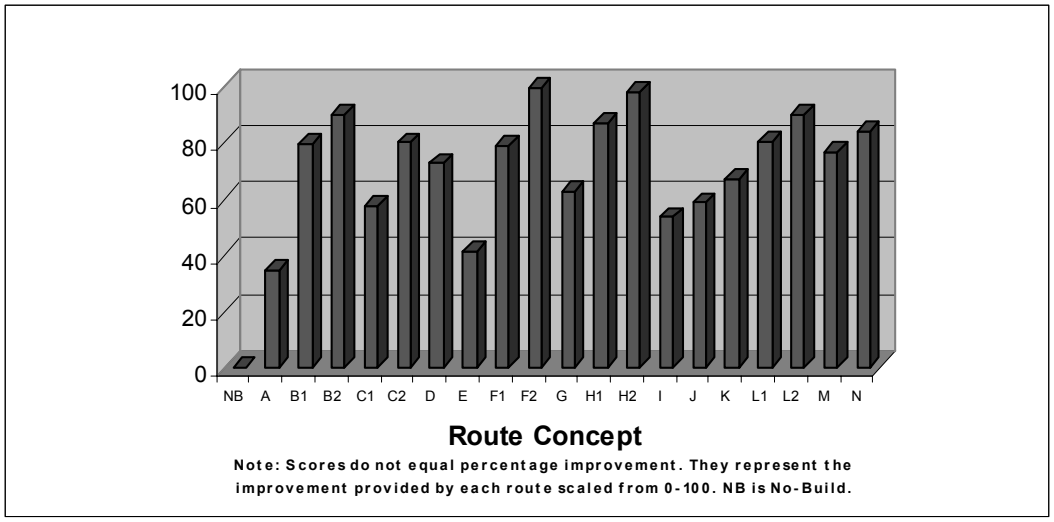


Table B2 - Year 2025 Business and Household Vehicle Operating Cost Savings

Alternative	Business & Household Vehicle Operating Cost Savings	Scaled Vehicle Operating Cost Scores	Rank
NB	$0	100.00	1
A	-$30,634,259	64.31	9
B1	-$39,521,366	53.96	12
B2	-$43,360,201	49.49	13
C1	-$21,881,709	74.51	7
C2	-$44,039,800	48.69	15
D	-$85,838,161	0.00	20
E	-$50,050,881	41.69	17
F1	-$15,914,828	81.46	4
F2	-$18,254,035	78.73	6
G	-$18,024,759	79.00	5
H1	-$37,867,958	55.88	11
H2	-$34,039,281	60.34	10
I	-$3,341,185	96.11	2
J	-$12,497,220	85.44	3
K	-$43,993,073	48.75	14
L1	-$48,404,552	43.61	16
L2	-$64,151,860	25.26	18
M	-$29,970,384	65.09	8
N	-$82,834,497	3.50	19

Note: Negative vehicle operating benefit shows an ***increase*** in vehicle operating costs.

Figure B2 - Scaled Year 2025 Business and Household Vehicle Operating Cost Savings

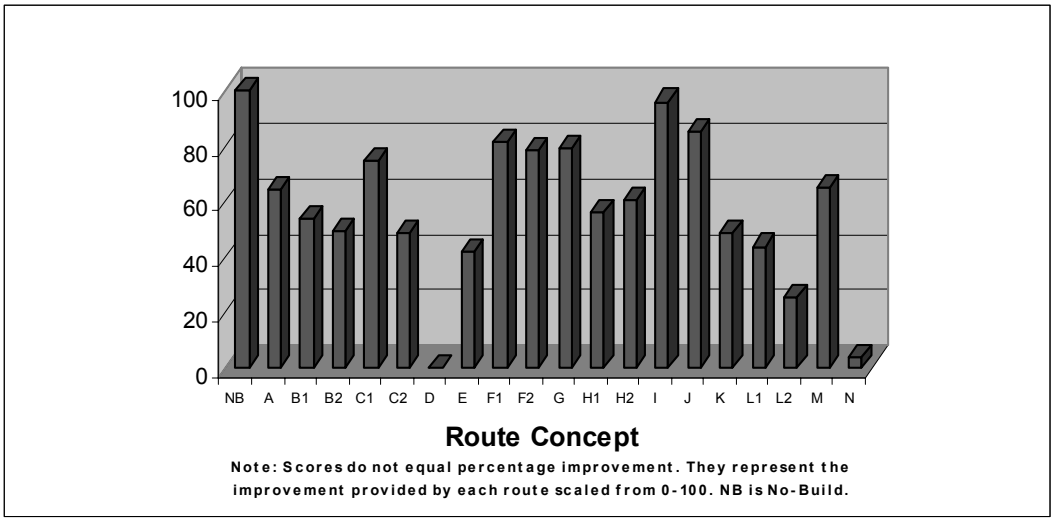


Table B3 - Year 2025 Business and Household Savings From Accident Reductions

Alternative	Business & Household Savings from Accident Reductions	Scaled Accident Reduction Score	Rank
NB	$0	0.00	20
A	$28,947,082	55.65	13
B1	$38,040,776	73.14	9
B2	$49,495,451	95.16	4
C1	$30,592,135	58.82	11
C2	$45,452,602	87.39	7
D	$52,013,168	100.00	1
E	$25,209,729	48.47	16
F1	$27,600,407	53.06	14
F2	$47,719,408	91.74	6
G	$27,498,827	52.87	15
H1	$37,934,582	72.93	10
H2	$49,451,338	95.07	5
I	$21,390,415	41.12	19
J	$22,673,472	43.59	17
K	$29,894,712	57.48	12
L1	$43,999,824	84.59	8
L2	$51,748,153	99.49	2
M	$22,570,872	43.39	18
N	$49,686,769	95.53	3

Figure B3 - Scaled Year 2025 Business and Household Savings From Accident Reductions

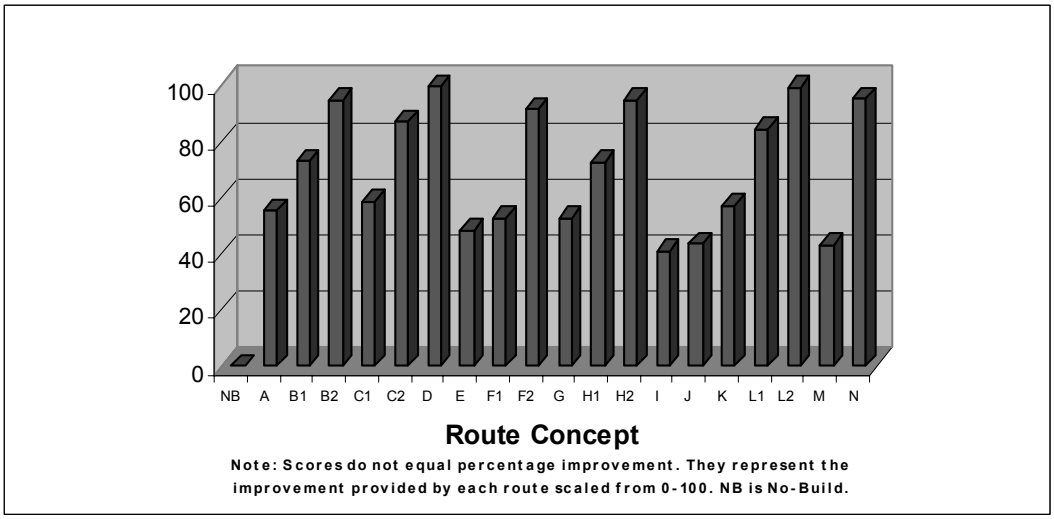
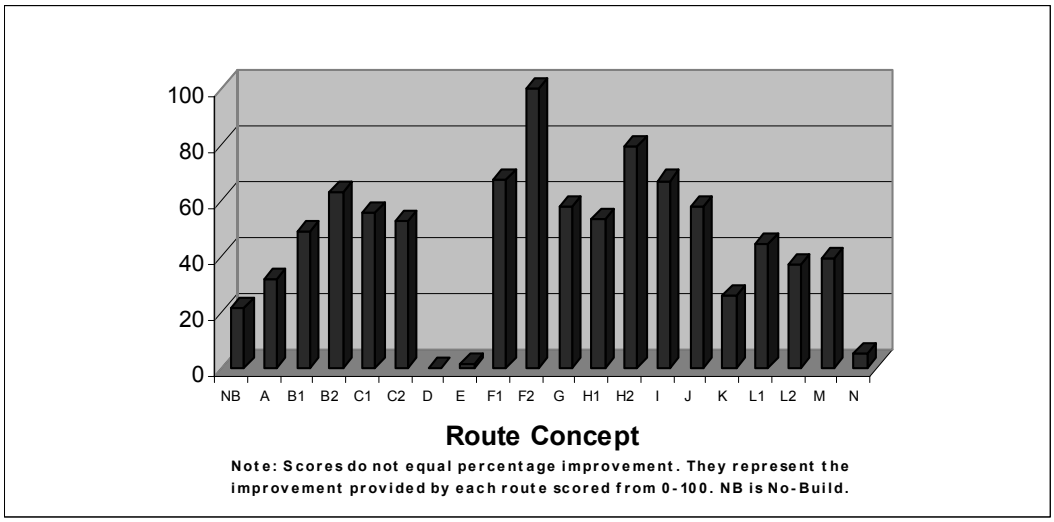


Table B4 - Composite Monetary Savings Values and Scores

Alternative	Truck & On-the-Clock Auto Trips Travel Time Mobility Benefits	Business & Household Savings from Accident Reductions	Business & Household Vehicle Operating Cost Savings	Monetary Grand Totals	Scaled Monetary User Benefits	Rank
NB	$0	$0	$0	$0	21.85	17
A	$8,897,377	$28,947,082	-$30,634,259	$7,210,200	32.12	15
B1	$20,264,556	$38,040,776	-$39,521,366	$18,783,966	48.61	11
B2	$22,815,301	$49,495,451	-$43,360,201	$28,950,551	63.10	5
C1	$14,740,360	$30,592,135	-$21,881,709	$23,450,786	55.26	8
C2	$20,355,195	$45,452,602	-$44,039,800	$21,767,997	52.86	10
D	$18,492,620	$52,013,168	-$85,838,161	-$15,332,373	0.00	20
E	$10,555,216	$25,209,729	-$50,050,881	-$14,285,936	1.49	19
F1	$20,162,389	$27,600,407	-$15,914,828	$31,847,968	67.22	3
F2	$25,385,140	$47,719,408	-$18,254,035	$54,850,513	100.00	1
G	$15,960,753	$27,498,827	-$18,024,759	$25,434,821	58.09	6
H1	$22,209,504	$37,934,582	-$37,867,958	$22,276,128	53.59	9
H2	$24,880,117	$49,451,338	-$34,039,281	$40,292,174	79.26	2
I	$13,624,508	$21,390,415	-$3,341,185	$31,673,738	66.98	4
J	$14,945,104	$22,673,472	-$12,497,220	$25,121,356	57.64	7
K	$17,067,906	$29,894,712	-$43,993,073	$2,969,545	26.08	16
L1	$20,408,850	$43,999,824	-$48,404,552	$16,004,122	44.65	12
L2	$22,883,818	$51,748,153	-$64,151,860	$10,480,111	36.78	14
M	$19,586,141	$22,570,872	-$29,970,384	$12,186,629	39.21	13
N	$21,417,600	$49,686,769	-$82,834,497	-$11,730,128	5.13	18

Figure B4 - Scaled Composite Monetary Savings Values



2. Business Accessibility

Just as southwestern Indiana residents experience poor accessibility, the same observation can be made regarding the area's businesses. Southwest Indiana businesses must compete with businesses that have far better access to available labor pools and supplier markets. The Council for Urban Economic Development's (CUED) study (conducted as part of the Purpose and Need phase of this Tier 1 EIS) cited anecdotal evidence as well as statistical data from economic development literature attesting to the importance of highway access to business success.

Two performance measures are used to assess the potential improvement of alternative route concepts to business accessibility. These are: (1) the percentage improvement in accessibility to labor and consumer markets, and: (2) the percentage improvement in accessibility to buyer and supplier markets. Accessibility to labor and consumer markets is measured as the percentage change in the population reachable within a half-hour drive of key locations in the I-69 Study Area; a half hour is viewed as a reasonable commuting time. Similarly, accessibility to buyer and supplier markets is measured in terms of the increase in employment within a three hour drive time.

Table and Figure B5 show the improvements in access to labor and consumer markets. Table and Figure B6 show the improvements in access to buyer and supplier markets. Table and Figure B7 show the composite improvement in business accessibility, by averaging the composite scores from the previous two measures.

Table B5 - Improvements in Access to Labor and Consumer Markets

Alternative	Percent Improvement, Population Within One-Half Hour	Scaled Scores	Rank
NB	0.00%	0.00	20
A	0.51%	13.97	19
B1	2.52%	69.01	7
B2	3.04%	83.12	6
C1	0.93%	25.47	14
C2	1.62%	44.30	12
D	1.55%	42.51	13
E	0.90%	24.65	15
F1	3.05%	83.46	5
F2	3.65%	100.00	1
G	1.86%	50.94	10
H1	3.17%	86.68	3
H2	3.63%	99.41	2
I	0.83%	22.70	16
J	0.68%	18.62	18
K	3.12%	85.44	4
L1	2.27%	62.21	9
L2	2.47%	67.58	8
M	0.78%	21.38	17
N	1.75%	47.79	11

Figure B5 - Scaled Improvements in Access to Labor and Consumer Markets

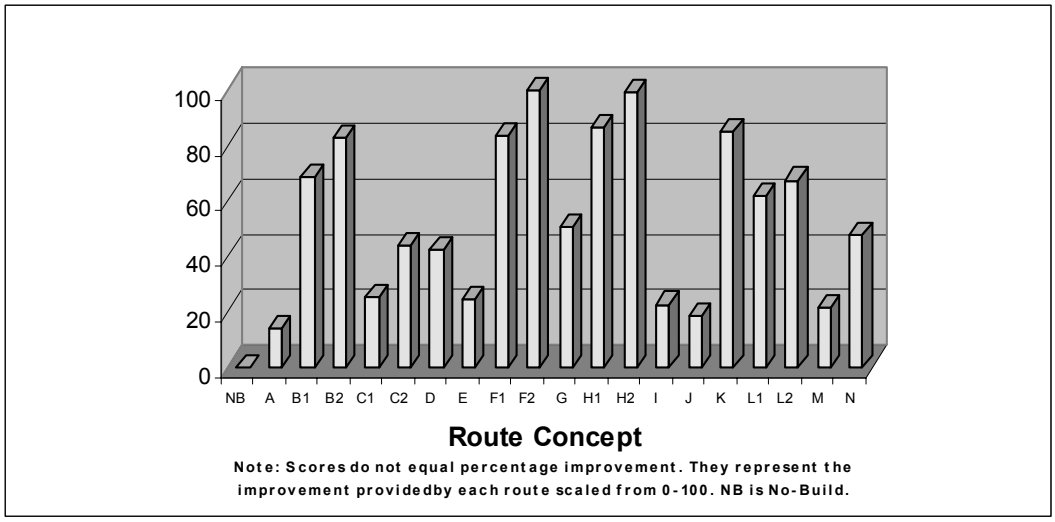


Table B6 - Improvements in Access to Buyer and Supplier Markets

Alternative	Improvements in Access to Buyer and Supplier Markets	Scaled Scores	Rank
NB	0.00%	0.00	20
A	1.74%	35.87	19
B1	3.94%	81.34	13
B2	4.32%	89.13	5
C1	3.64%	75.08	15
C2	3.83%	79.08	14
D	3.95%	81.56	12
E	2.56%	52.76	18
F1	4.52%	93.21	4
F2	4.85%	100.00	1
G	4.03%	83.07	10
H1	4.64%	95.60	3
H2	4.75%	98.02	2
I	3.18%	65.55	17
J	4.06%	83.84	7
K	4.14%	85.30	6
L1	4.03%	83.16	9
L2	4.03%	83.22	8
M	3.26%	67.22	16
N	4.01%	82.67	11

Figure B6 - Scaled Improvements in Access to Buyer and Supplier Markets

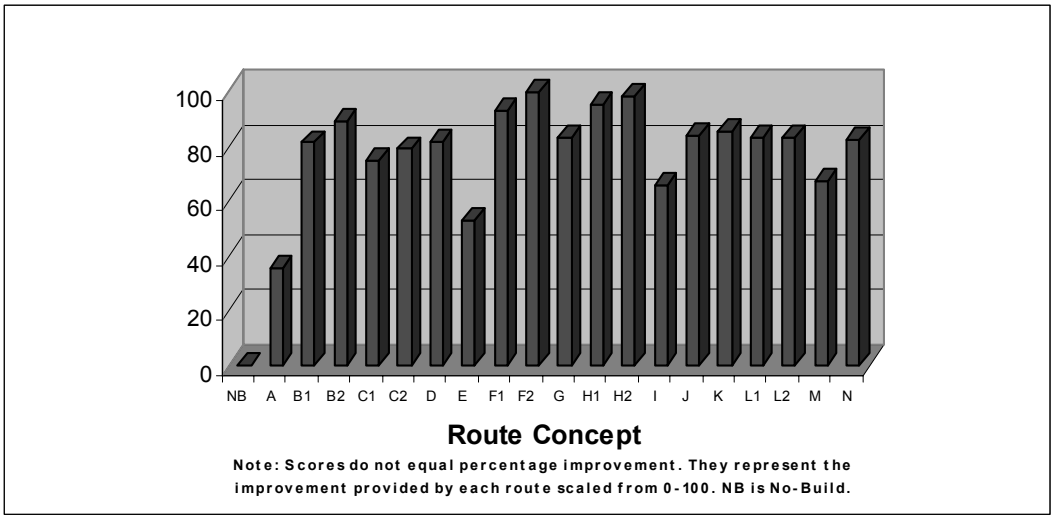
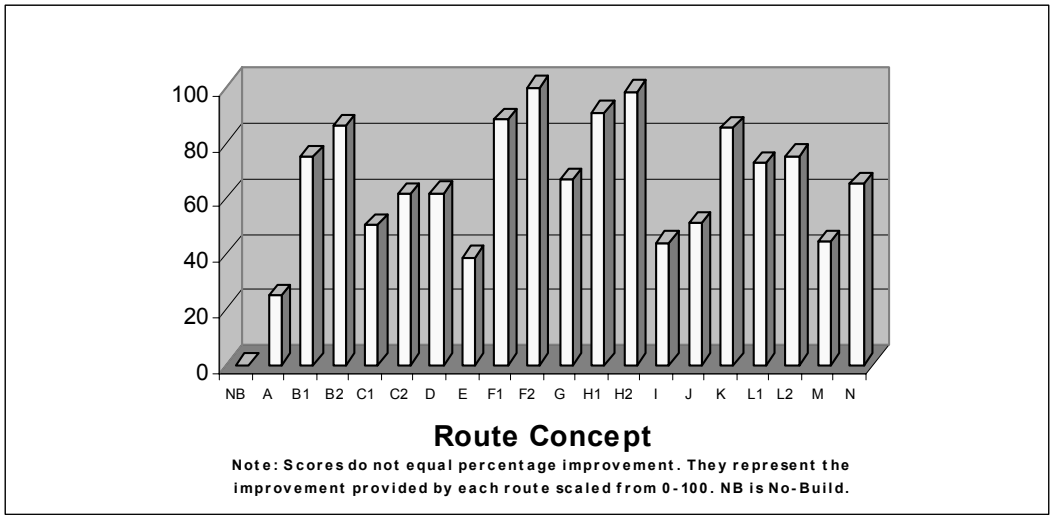


Table B7 - Composite Improvement in Business Accessibility

Alternative	Composite L&C Scores	Composite B&S Scores	Overall Composite Scores	Rank
NB	0.00	0.00	0.00	20
A	13.97	35.87	24.92	19
B1	69.01	81.34	75.17	8
B2	83.12	89.13	86.12	5
C1	25.47	75.08	50.27	15
C2	44.30	79.08	61.69	13
D	42.51	81.56	62.03	12
E	24.65	52.76	38.71	18
F1	83.46	93.21	88.34	4
F2	100.00	100.00	100.00	1
G	50.94	83.07	67.00	10
H1	86.68	95.60	91.14	3
H2	99.41	98.02	98.72	2
I	22.70	65.55	44.12	17
J	18.62	83.84	51.23	14
K	85.44	85.30	85.37	6
L1	62.21	83.16	72.68	9
L2	67.58	83.22	75.40	7
M	21.38	67.22	44.30	16
N	47.79	82.67	65.23	11

Figure B7 - Scaled Composite Improvement in Business Accessibility



3. Long-Term Economic Growth

The Purpose and Need Statement reported on long-term, historic trends in percentage employment growth in southwestern Indiana (excluding the Indianapolis MSA) and Indiana as a whole. These growth trends were compared with the United States for the same time period. The trend analysis showed that both the State, as a whole, and southwestern Indiana lagged far behind the nation. Furthermore, additional research has shown that the highest-growth industries in the U.S. are significantly under represented in Indiana and the Study Area.[1] Similarly, effective buying income and per-capita personal income have traditionally been lower in the Study Area than the rest of Indiana.

This family of economic growth performance measures is comprised of employment, income, and sales variables. Employment measures consider forecasted net change in employment and employment in high growth and high-paying industries. Income measures include net change in real disposable income and net change in farm and forestry income. Estimated changes in roadside business sales is the sales variable in this family of performance measures. The farm/forestry income and roadside business variables were included to appropriately "penalize" route concepts that might achieve economic growth at the expense of existing businesses. Tables and Figures B8 through B10 give the performance of each alternative on each of the individual measures in this family (Employment, Income, and Sales). Table and Figure B11 combine them into a composite score.

It must be noted that this family, as well as the next, is dependent in part or in whole on regional econometric modeling that was conducted for seven of the route concepts. The modeling was not conducted for all concepts due in large part to the fact that these modeling tools cannot accurately forecast differences between routes unless there are significant differences in "total highway user benefits." All route concepts were assigned to a group represented by a single route for which the analysis was conducted. The performance measures for the routes that were not analyzed were assumed to be the same as those that were explicitly analyzed. With three exceptions, the highway user benefits within each respective group fell within a range of 10% of their mean. These three "outliers were modeled individually. These three were route concepts A, E, and K.

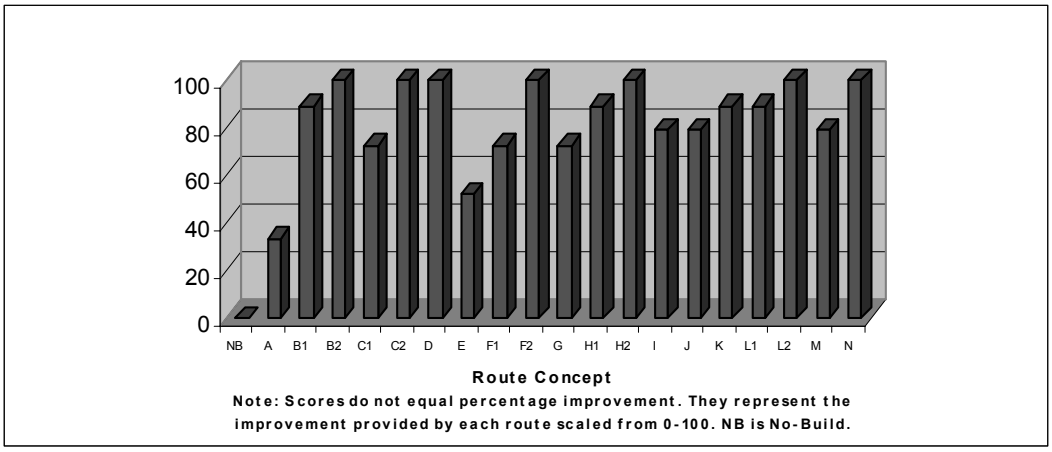
Net change in farm and forest income, as well as estimated change in roadside business sales, were computed for each of the 19 "build alternatives." This explains the small variations in composite route scores among groupings of similar routes which otherwise were analyzed as a group.

[1] See Task 3.4 Technical Report, *Regional Economics Needs Analysis.*

Table B8 - Changes in Study Area Employment

Alternative	Net Employment Change	EMPLOYMENT IN:		SCALED SCORES			Composite Scaled Scores
		High Growth Industries*	High Pay Industries*	Net Empl Growth	High Growth Industries	High Paying Industries	
NB	-	-	-	0.00	0.00	0.00	0.00
A	1,500	700	600	31.25	31.82	37.50	33.52
B1	4,200	1,900	1,500	87.50	86.36	93.75	89.20
B2	4,800	2,200	1,600	100.00	100.00	100.00	100.00
C1	3,300	1,500	1,300	68.75	68.18	81.25	72.73
C2	4,800	2,200	1,600	100.00	100.00	100.00	100.00
D	4,800	2,200	1,600	100.00	100.00	100.00	100.00
E	2,400	1,100	900	50.00	50.00	56.25	52.08
F1	3,300	1,500	1,300	68.75	68.18	81.25	72.73
F2	4,800	2,200	1,600	100.00	100.00	100.00	100.00
G	3,300	1,500	1,300	68.75	68.18	81.25	72.73
H1	4,200	1,900	1,500	87.50	86.36	93.75	89.20
H2	4,800	2,200	1,600	100.00	100.00	100.00	100.00
I	3,500	1,700	1,400	72.92	77.27	87.50	79.23
J	3,500	1,700	1,400	72.92	77.27	87.50	79.23
K	4,200	1,900	1,500	87.50	86.36	93.75	89.20
L1	4,200	1,900	1,500	87.50	86.36	93.75	89.20
L2	4,800	2,200	1,600	100.00	100.00	100.00	100.00
M	3,500	1,700	1,400	72.92	77.27	87.50	79.23
N	4,800	2,200	1,600	100.00	100.00	100.00	100.00

Figure B8 - Scaled Changes in Study Area Employment

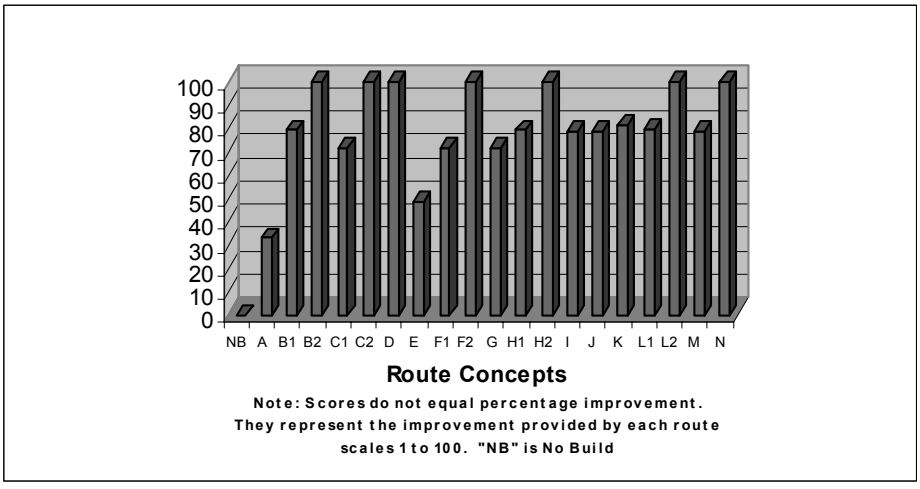


To compute changes in Study Area income, the net losses in farm income and in forest income were subtracted from the forecasted growth in real disposable income.

Table B9 - Changes in Study Area Income

Alternative	Net Growth in Real Disposable Income	Net Loss in Farm and Forestry Income		Total	Composite Scores	Rank
		Farm	Forest			
NB	$ -	$ -	$ -	$ -	0.00	20
A	$ 94,500,000	$ (300,000)	$ (4,500)	$ 94,195,500	33.11	19
B1	$ 225,900,000	$ (344,000)	$ (10,300)	$ 225,545,700	79.28	11
B2	$ 284,700,000	$ (421,000)	$ (8,300)	$ 284,270,700	99.93	6
C1	$ 204,000,000	$ (489,000)	$ (3,800)	$ 203,507,200	71.54	17
C2	$ 284,700,000	$ (583,000)	$ (3,600)	$ 284,113,400	99.87	7
D	$ 284,700,000	$ (409,000)	$ (12,400)	$ 284,278,600	99.93	5
E	$ 138,300,000	$ (411,000)	$ (10,700)	$ 137,878,300	48.47	18
F1	$ 204,000,000	$ (321,000)	$ (8,400)	$ 203,670,600	71.60	16
F2	$ 284,700,000	$ (365,000)	$ (6,900)	$ 284,328,100	99.95	4
G	$ 204,000,000	$ (281,000)	$ (9,500)	$ 203,709,500	71.61	15
H1	$ 225,900,000	$ (264,000)	$ (9,800)	$ 225,626,200	79.31	10
H2	$ 284,700,000	$ (331,000)	$ (7,900)	$ 284,361,100	99.96	3
I	$ 224,100,000	$ (294,000)	$ (4,100)	$ 223,801,900	78.67	13
J	$ 224,100,000	$ (363,000)	$ (4,600)	$ 223,732,400	78.65	14
K	$ 232,200,000	$ (268,000)	$ (15,200)	$ 231,916,800	81.52	8
L1	$ 225,900,000	$ (219,000)	$ (9,500)	$ 225,671,500	79.33	9
L2	$ 284,700,000	$ (277,000)	$ (7,800)	$ 284,415,200	99.98	2
M	$ 224,100,000	$ (219,000)	$ (10,200)	$ 223,870,800	78.70	12
N	$ 284,700,000	$ (214,000)	$ (10,400)	$ 284,475,600	100.00	1

Figure B9 - Scaled Changes in Study Area Income



Roadside business sales have been computed as a range, due to substantial uncertainties about highway alignments in relation to the location of existing businesses. Both the low end and high end of this range are shown in Table B10. Figure B10 graphs the low end results. These low end estimates were used in computing the composite performance for this family of alternatives. These low end estimates were used in order to capture the potential downside effects of a route.

It must be noted that this indicator estimates changes on existing highways in or near each of the route corridors. There will be redistributive effects, and many if not most of the increases or decreases in sales in the specific corridor will be offset by opposite changes elsewhere. However, these offsetting changes will be widely scattered, and will probably not be noticeable outside of the corridor where the highway is located.

Figure B10 - Changes in Roadside Business Sales in Highway Corridor

Alternative	Annual Change in Sales ($ Thousands)		Low Sales Total	
	Low	High	Score	Rank
NB			55.26	9
A	$ (7,220)	$ (7,220)	52.30	10
B1	$ 22,185	$ 96,791	64.36	6
B2	$ 109,117	$182,874	100.00	1
C1	$ (59,815)	$169,430	30.74	14
C2	$ 41,057	$277,918	72.10	3
D	$ 2,383	$ 64,865	56.24	8
E	$ (40,718)	$ 66,540	38.57	12
F1	$ (73,478)	$168,559	25.14	18
F2	$ 24,894	$275,879	65.47	5
G	$ (10,984)	$ 71,187	50.76	11
H1	$ (55,694)	$164,489	32.43	13
H2	$ 32,481	$242,757	68.58	4
I	$(134,786)	$178,846	0.00	20
J	$(112,524)	$220,408	9.13	19
K	$ (60,506)	$130,045	30.45	15
L1	$ (67,231)	$154,083	27.70	16
L2	$ 18,545	$234,884	62.87	7
M	$ (72,235)	$ 59,953	25.65	17
N	$ 53,737	$141,011	77.29	2

Figure B10 - Scaled Changes in Roadside Business Sales in Highway Corridor

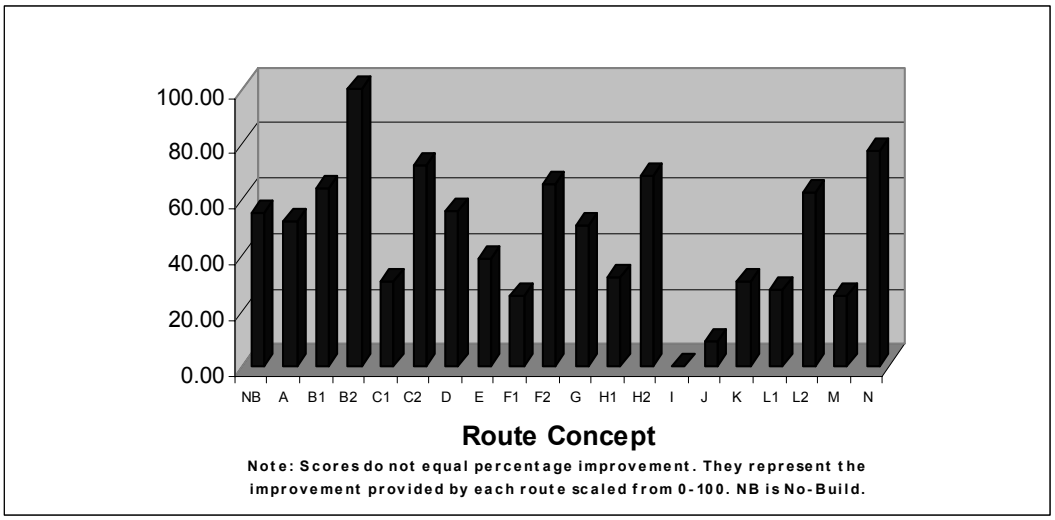
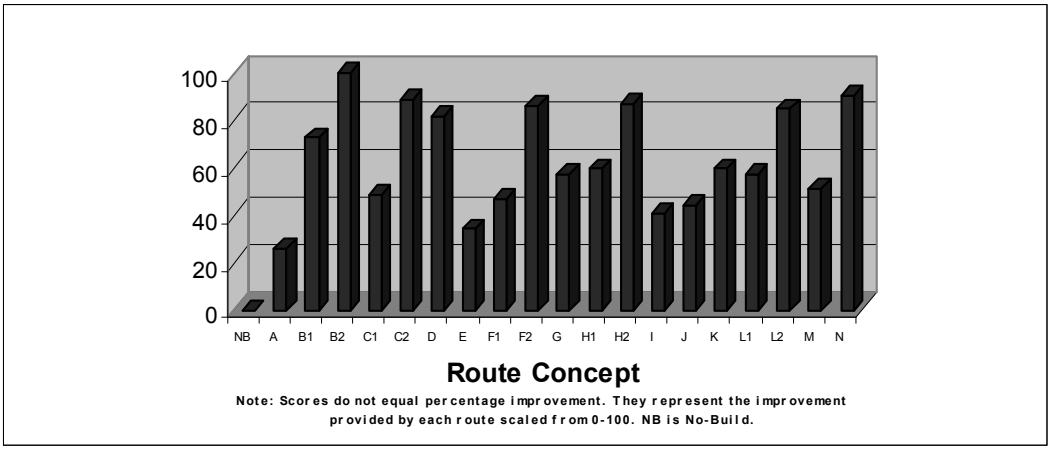


Table B11 - Composite Long-Term Economic Growth Scores

Alternative	Composite Scores			Family 7 Composite Scores	Rank
	Employment	Income	Sales		
NB	0.00	0.00	55.26	0.00	20
A	33.52	33.11	52.30	26.03	19
B1	89.20	79.28	64.36	72.58	8
B2	100.00	99.93	100.00	100.00	1
C1	72.73	71.54	30.74	48.94	14
C2	100.00	99.87	72.10	88.57	3
D	100.00	99.93	56.24	82.12	7
E	52.08	48.47	38.57	34.27	18
F1	72.73	71.60	25.14	46.67	15
F2	100.00	99.95	65.47	85.89	5
G	72.73	71.61	50.76	57.15	12
H1	89.20	79.31	32.43	59.54	10
H2	100.00	99.96	68.58	87.17	4
I	76.20	78.67	0.00	40.71	17
J	76.20	78.65	9.13	44.43	16
K	89.20	81.52	30.45	59.64	9
L1	89.20	79.33	27.70	57.62	11
L2	100.00	99.98	62.87	84.84	6
M	76.20	78.70	25.65	51.20	13
N	100.00	100.00	77.29	90.75	2

Figure B11 - Scaled Composite Long-Term Economic Growth Scores



4. Social Distribution of Economic Benefits

There are pockets of serious poverty and high unemployment rates in southwestern Indiana.[2] A family of performance measures was developed to assess the social distribution of benefits which potentially could be stimulated by an Interstate Highway. These include employment, income, and demographic variables for the Study Area, all projected for the Year 2025.

The ***employment*** variable is the forecasted ratio of employment-to-labor force in the Study Area. This is an indicator provided by the Regional Economic Model Inc. (REMI) macroeconomic forecasting model, and tracks closely with the unemployment rate.

The ***income*** variable is the change in transfer payments per capita. This measures various forms of government assistance to individuals and families. A negative value for this measure is desirable.

The ***demographic*** variable is the change in young (age 25 - 44) working age population. The loss of young workers has been cited as a notable problem in the Study Area.

Table B11 shows the performance measures and scaled scores for each measure. Figure B11 shows the composite score for all three social equity measures.

[2] See Task 3.4 Technical Report, *Regional Economics Needs Analysis.*

Table B11 - Social Equity Performance Measures, Year 2025

Alternative	Change in Ratio of Employment to Labor Force		Change in Transfer Payments Per Capita		Change in Young Working Age Population		Family 8 Composite Scores
	% Point	Scaled Scores	Change	Scaled Scores	Change	Scaled Scores	
NB	0.0000%	0.00	$0	0.00	0	0.00	0.00
A	0.0046%	28.40	($4)	36.36	900	31.03	31.93
B1	0.0158%	97.53	($10)	90.91	2,600	89.66	92.70
B2	0.0162%	100.00	($11)	100.00	2,900	100.00	100.00
C1	0.0083%	51.23	($8)	72.73	2,000	68.97	64.31
C2	0.0162%	100.00	($11)	100.00	2,900	100.00	100.00
D	0.0162%	100.00	($11)	100.00	2,900	100.00	100.00
E	0.0078%	48.15	($6)	54.55	1,500	51.72	51.47
F1	0.0083%	51.23	($8)	72.73	2,000	68.97	64.31
F2	0.0162%	100.00	($11)	100.00	2,900	100.00	100.00
G	0.0083%	51.23	($8)	72.73	2,000	68.97	64.31
H1	0.0158%	97.53	($10)	90.91	2,600	89.66	92.70
H2	0.0162%	100.00	($11)	100.00	2,900	100.00	100.00
I	0.0073%	45.06	($8)	72.73	2,200	75.86	64.55
J	0.0073%	45.06	($8)	72.73	2,200	75.86	64.55
K	0.0161%	99.38	($10)	90.91	2,500	86.21	92.17
L1	0.0158%	97.53	($10)	90.91	2,600	89.66	92.70
L2	0.0162%	100.00	($11)	100.00	2,900	100.00	100.00
M	0.0073%	45.06	($8)	72.73	2,200	75.86	64.55
N	0.0162%	100.00	($11)	100.00	2,900	100.00	100.00

Figure B11 - Scaled Changes in Social Equity Composite Scores